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Primary total knee arthroplasty for elderly complex tibial plateau fractures

Jie-Feng Huang [a], Jian-Jian Shen [b, *], Jun-Jie Chen [a], Pei-Jian Tong [a]

[a] Department of Orthopedics, The First Affiliated Hospital of Zhejiang Chinese Medical University, Hangzhou, China
[b] Department of Orthopedics, Wenzhou Medical College-Affiliated Cixi Hospital Cixi, Zhejiang, China

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ABSTRACT

Objective: The aim of this study is to evaluate the clinical and radiologic results of primary Total Knee Arthroplasty (TKA) for elderly complex tibial plateau fractures.
Materials and methods: Between November 2010 and February 2012, six cases of elderly complex tibial plateau fractures were treated with primary TKA using the standard medial parapatellar approach. All six patients were available at follow up with mean duration of 32.3 months (range 25–41 months). There were 3 women and 3 men with an average age of 69.5 years (58–78 years) at the time of the arthroplasty.
Results: The mean Hospital for Special Surgery (HSS) knee score was 89.8 (range 85–94): 6/6 excellent. The mean knee flexion was 119.2° (105–130°). No significant postoperative complications were noted. None of these patients had significant postoperative knee pain required revision surgery, or had radiographic loosening of the components at the latest follow-up.
Conclusions: TKA is a suitable solution for the treatment of elderly patients with complex tibial plateau fractures.
Level of Evidence: Level IV, Therapeutic study

Introduction

Traditionally, complex displaced intra-articular fractures of the proximal tibia were treated by open reduction and internal fixation (ORIF),[1,2] external fixation,[3] and eventually secondary total knee arthroplasty (TKA)[4,5] in case of failure or complications.

Complex fractures of the tibial plateau present a surgical treatment challenge. Such injuries are usually the result of high-energy trauma, and the management of such fractures is associated with an increased incidence of soft-tissue damage, infection, loss of motion, development of posttraumatic arthritis, and knee instability.[6–8] High-grade injuries in elderly patients are more likely to lead to more severe arthritis. Marco Frattini et al only obtained satisfactory results (52.6% clinical outcomes and 31.6% radiographic outcomes, respectively) in elderly patients treated with ORIF of complex tibial plateau fractures.[9] Two recent literatures reported the incidence of posttraumatic arthritis following tibia plateau comminuted fracture of 39.1% and 58%, respectively.[1,10] Pre-existing osteoarthritis and osteoporosis, cartilage damage during trauma, suboptimal reduction and fixation due to poor bone stock and/or secondary displacement frequently lead to poor outcome in elderly patients.

Despite the operation works, patients are also unable to have early full-weight bearing. Usually, a revision surgery, which is more difficult, is needful because of limb malalignment, anatomical deformity, posttraumatic arthritis, posttraumatic knee stiffness, pain and poor range of movement.[4,5,11] On the basis of the available data in the literature, one can deduce that the outcomes of TKA in patients with a prior fracture are inferior to those of primary TKA.[11–13] In addition, a multiple incisions operation before often leads to poor soft-tissue envelope and the infection also plays an important role.[4,14–16]

For the reasons above, we investigated the possibility to perform a TKA as a primary treatment in elderly patients with complex tibial plateau fractures. Although primary TKA for these fractures is not well-accepted treatment option as primary hip arthroplasty for femoral neck fractures.[17] However, primary TKA has the potential to bypass many of the above-mentioned difficulties and provide a stable knee for early full-weight bearing. The purpose of this study

* Corresponding author.
E-mail address: cryorthopaedic@163.com (J.-J. Shen).

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was to evaluate the clinical and radiologic results of primary TKA with a minimum of 2-years follow-up in elderly patients with a complex tibial plateau fractures.

Patients and methods

Between November 2010 and February 2012, six patients with a closed complex tibial plateau fracture underwent primary TKAs and were included in this retrospective study. All six patients had unilateral plateau fractures. Leading causes of the fractures were high-energy traffic accidents and fallen from height. The Hospital Ethics committee approved the study protocol, and all patients gave their informed consent. They were at least 58 years old with poor bone quality and presenting with a complex tibial plateau fracture that would be difficult to treat with ORIF.

There were 3 women and 3 men, with an average age at the time of index operation of 69.5 years (range: 58–78). All were closed fractures. One case combined with a compromised knee subluxation and medial collateral ligament (MCL) injury (Fig. 1 a–e), three with meniscus injuries, and one with anterior cruciate ligament (ACL) injury. Fractures were classified according to Schatzker Classification[18]: 4 of type-Vand 2 of type-VI. The duration of clinical follow-up averaged 32.3 months (range: 25–41 months). Clinical evaluation was performed according to the Hospital for Special Surgery (HSS) knee score and radiographs of the knees. Information about type of Schatzker Classification, associated injuries, prosthesis, bone defect after resection, complications, immediate weight bearing, duration of hospitalization, knee motion and HSS was collected (Table 1).

Surgical technique

All the procedures were performed by the Senior Author (Pei-Jian Tong). Using a pneumatic tourniquet applied about the upper thigh, the standard medial parapatellar approach was adopted. A medial parapatellar arthrotomy was performed in all the cases to evert the patella. Pay attention to prevent patellar tendon rupture while the surgeons attempt to obtain adequate exposure.

Fig. 1. Preoperative radiographs of a 58-year-old woman with Schatzker type-Vcomplex tibial plateau fracture with a compromised knee subluxation and MCL injury (←) (a, b). Preoperative three-dimensional computed tomography (CT) and Magnetic Resonance Imaging (MRI), (c, d, e). Postoperative radiographs of the knee after performance of TKA for 2 years with NexGen LPS femoral component and NexGen LCCK tibial component, (f, g). Photographs of Knee ROM 2 years after surgery, (h, i). This patient had an excellent result for HSS knee score 92.

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